

WHAT IS CLAIMED IS:

1 1. A method of initializing a communication link between a first
2 transceiver and a second transceiver for transferring data therebetween, said method
3 comprising:
4 analyzing channel properties of a plurality of sub-channels within said
5 communication link;
6 identifying a predefined number of sub-channels having an anticipated highest
7 performance for communication;
8 communicating said sub-channels between said first and second transceivers;
9 and
10 transmitting information for initializing said communication link using said
11 sub-channels.

1 2. The method of claim 1, wherein said anticipated highest performance
2 is determined by a signal-to-noise ratio (SNR) of said sub-channels.

1 3. The method of claim 1, wherein said first transceiver identifies a first
2 set of said sub-channels for upstream communication and said second transceiver identifies a
3 second set of said sub-channels for downstream communication.

1 4. The method of claim 1, wherein said communicating further comprises
2 communicating said sub-channels using a one bit per symbol modulation scheme.

1 5. The method of claim 1, wherein said act of communicating further
2 comprises communicating a cyclic prefix in addition to said sub-channels.

1 6. The method of claim 1, wherein said act of communicating further
2 comprises communicating a validity check in addition to said sub-channels.

1 7. The method of claim 1, wherein said information for initializing said
2 communication link is transmitted using a two bit per symbol modulation scheme.

1 8. A method of initializing a communication link between a first
2 transceiver and a second transceiver for transferring data therebetween, said method
3 comprising:

4 identifying a predefined number of sub-channels having an anticipated highest
5 performance for communication;
6 communicating said sub-channels between said first and second transceivers;
7 and
8 transmitting information for initializing said communication link using said
9 sub-channels.

1 9. An apparatus in an asynchronous digital subscriber line (ADSL)
2 central office termination unit (ATU-C) for improving performance of a communication link,
3 comprising a processor configured to control said ATU-C to execute processing that includes:
4 analyzing channel properties of a plurality of sub-channels within said
5 communication link;
6 identifying a predefined number of first sub-channels having an anticipated
7 highest performance for communication;
8 communicating, to an ADSL remote termination unit (ATU-R), said first
9 sub-channels;
10 receiving, from said ATU-R, information identifying a predefined number of
11 second sub-channels;
12 receiving, from said ATU-R using said second sub-channels, information for
13 initializing said communication link; and
14 transmitting, to said ATU-R using said first sub-channels, information for
15 further initializing said communication link.

1 10. The apparatus of claim 9, wherein said processor is further configured
2 to control said ATU-C to communicate said first sub-channels using a one bit per symbol
3 modulation scheme.

1 11. The apparatus of claim 9, wherein said processor is further configured
2 to control said ATU-C to communicate a cyclic prefix in addition to said first sub-channels.

1 12. The apparatus of claim 9, wherein said processor is further configured
2 to control said ATU-C to communicate a validity check in addition to said first sub-channels.

1 13. The apparatus of claim 9, wherein said processor is further configured
2 to control said ATU-C to transmit said information for initializing said communication link
3 using a two bit per symbol modulation scheme.

1 14. An apparatus in an asynchronous digital subscriber line (ADSL)
2 remote termination unit (ATU-R) for improving performance of a communication link,
3 comprising a processor configured to control said ATU-R to execute processing that includes:
4 analyzing channel properties of a plurality of sub-channels within said
5 communication link;
6 identifying a predefined number of first sub-channels having an anticipated
7 highest performance for communication;
8 communicating, to an ADSL central office termination unit (ATU-C), said
9 first sub-channels;
10 transmitting, to said ATU-C using said first sub-channels, information for
11 initializing said communication link;
12 receiving, from said ATU-C, information identifying a predefined number of
13 second sub-channels; and
14 receiving, from said ATU-C using said second sub-channels, information for
15 further initializing said communication link.

1 15. The apparatus of claim 14, wherein said processor is further configured
2 to control said ATU-R to communicate said first sub-channels using a one bit per symbol
3 modulation scheme.

1 16. The apparatus of claim 14, wherein said processor is further configured
2 to control said ATU-R to communicate a cyclic prefix in addition to said first sub-channels.

1 17. The apparatus of claim 14, wherein said processor is further configured
2 to control said ATU-R to communicate a validity check in addition to said first sub-channels.

1 18. The apparatus of claim 14, wherein said processor is further configured
2 to control said ATU-R to transmit said information for initializing said communication link
3 using a two bit per symbol modulation scheme.